

INTRODUCTORY LECTURE

TO THE COURSE OF

THE INSTITUTES OF MEDICINE,

DELIVERED IN THE

UNIVERSITY OF PENNSYLVANIA,

NOVEMBER 6, 1837.

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BY SAMUEL JACKSON, M. D.  
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## CORRESPONDENCE.

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*University of Pennsylvania, November 13, 1837.*

PROFESSOR SAMUEL JACKSON,

SIR.—At a Meeting of the Medical Class of the University of Pennsylvania, held this day, it was unanimously resolved, that a copy of your very able and appropriate Introductory Lecture be requested for publication.

As a Committee appointed for that purpose, we take great pleasure in tendering you their request, and indulge the hope that their solicitations will meet with your compliance.

With sentiments of individual esteem and regard, we remain your's, &c.,

FRANCIS B. CARTER,  
PHILIP A. SCHUYLER,  
GEORGE G. NOLAND,  
JOHN E. TUCKER,  
JOHN A. GUION.

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*Philadelphia, November 17, 1837.*

TO MESSRS. FRANCIS B. CARTER, PHILIP A. SCHUYLER, GEORGE G. NOLAND, JOHN E. TUCKER, and JOHN A. GUION :

GENTLEMEN.—The request of the Medical Class of the University of Pennsylvania, communicated to me, last evening, in your note of 13th instant, does not admit of a refusal.

A copy of my Lecture will be ready, in a few days, to be placed in your hands for publication.

Accept gentlemen individually my sentiments of regard, and believe me, truly your's,

SAMUEL JACKSON.





## INTRODUCTORY LECTURE.

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GENTLEMEN—

THE Physiological sciences embrace the whole phenomena of organic life. The end of those sciences is Therapeutics, or the practical application of the powers of medicinal and remedial agents to the relief of the sufferings and maladies to which man is subject. Diseases are a modification of the natural organic phenomena. They are not independent of organization, and can be rationally treated only when the human organization, in its natural and pathological states, is minutely investigated—when the modifying influences of exterior agents and internal operations, pathological in effect, or therapeutic in action, have been fully developed and are clearly understood.

The science of medicine, then, commences with organic matter in its simplest and primitive forms; follows it through all its evolutions into tissues, organs, organic beings, and their attendant phenomena; investigates the modifications each of them experiences, and the influences under which they take place. From all these it derives the principles and axioms of a science; arranges and classifies the varied phenomena in their appropriate order, and renders the whole available in a practical application for the noblest of purposes—the relief of suffering humanity—the prolongation of human existence.

All animals of the more perfect forms of organization, possess an inherent, an instinctive fear of death—an instinctive attachment to life. They are endowed with the function of sensibility, from which they suffer painful or oppressive sensations in the morbid derangements of their organs, or from the presence of

causes offensive to their economy ;—it imparts pleasurable and agreeable sensations in the healthful play of the organs—or, from impressions of a beneficial character. The one sensation causes aversion—is shunned, fled from, guarded against ;—the other creates desire—is sought for, is procured. The resources of the intellect are called into active operation—the mind is impelled to devise the means for protection against the one ; to obtain the gratification and enjoyment of the other. The sentiment of self-preservation is founded in deeply rooted and organic instincts ; it is a force compelling to the actions necessary for the accomplishment of its ends. Self-preservation is not intrusted to the operations of the reasoning powers, or the action of volition, but is a dominant necessity, irresistible in its behests.

Man continues to live, and seeks the means of preserving life, not from a rational conviction that it is best, but from the controlling action of a power superior to reason, that, engrafted on his organization, is a part of his nature—is inseparable from his existence.

To these inherent organic instincts is to be traced the healing art—the divine art—the science of medicine. They are its sources. From them it springs like a mighty stream fed by fountains up-gushing from exhaustless reservoirs in the deep bosom of nature. On it flows, and has continued to flow through ages and ages, widening, enlarging, deepening—commingling in the vast ocean of universal science.

The medical art is an inherent want of man's economy ; it is an indispensable part in the great economy of nature, producing the adaptation and fitness of things.

Thus, necessarily identified with the human organization, medicine is an emanation of these divine laws, by which the Creator has established the harmony of the universe. Its absence would cause a hiatus—a void in the connected series of the phenomena composing the universe. There would be a defect in creation ; for, there would exist a class of phenomena, without a relative or an opposing class ; a force of destructive tendency that would terminate in annihilation, without an antagonizing principle to protect by a reactive power ; there would be

means without an adaptation to an end; for how many natural bodies are endowed with powers of great activity, having a specific affinity, or relation to particular organs, influencing them in an especial manner, discovered and appropriated by the science of medicine to the useful purpose of relief in a suffering state. Medicine, it is true, is the creation of intelligence; but the intellect is compelled to labour in this direction, and to call into existence this kind of knowledge, by the mind-ruling, will-subduing instinctive sensations of the organs. The first individual who suffered was the first physician. The want of relief in pain, and the anguish of disease, drove to a research of means for the alleviation of suffering, and the organic instincts, often the best instructors, if physicians would consult them, directed where remedies could be found, how and when they should be applied.

The science and art of medicine, we have seen, are necessary results of the human organization, originating from and fashioned by the incessant liability of its structure and functions to be disordered and deranged. This organization is the most exalted mechanism, proceeding from the universal and eternal creative power—complicated in its composition, intricate in its machinery, incomprehensible in its powers, its workings, its mode of existence and being.

We study it, but have penetrated no deeper than its outward forms; yet, we call this poor gleanings—knowledge. Or, we obtain at best partial glimpses, like labourers in deep mines, with imperfect lights, of some of the wonderful movements, the unceasing activity, in the actions, at once productive and destructive of this life and death-mechanics; for at each instant of time, in every action of life, an atom dies and an atom lives.

In its physical structure, it presents to us chemical elements in their most complicated state of combination, and hence organic chemistry baffles, as yet, all the researches of the chemists. The organic elements are, again, entirely dissimilar—have each their essential attributes—their peculiar properties. These are formed into organic filaments, from which are mysteriously spun the tissues and organs—the instruments of vitality—and



these again combined in action, and associated in function, constitute an individual, forming a unity from plurality—one living being from many living organs—each of which possesses the attributes of distinct living beings, except the self-sustaining power of life. Truly may it be said of this material organization, so fearfully and wonderfully constructed, that it is a “flesh garment, contextured in the loom of heaven.”

But, if we stand before this God-created structure, bewildered in our attempts to solve the mysteries of its production—of its formation—of its intimate arrangement, how utterly hopeless the attempt to penetrate to the still more incomprehensible and inexplicable nature of its life-force—of that which gives activity, energy, animation, to what would be the brute, dull matter of the earth—and is still the link that chains the immortal and the eternal to that which is of time and immortality. This plastic force, common to vegetable and animal organic matter, is of unintermitting activity. Movement, form, being, change, are the products of its action. It plays with the elements, and transmutes the forms of matter composed of them. Vegetable it converts into animal and animal into vegetable organic matter. The organic fluids are formed into solids, and the organic solids into fluids. Each tissue, and organ, and being, it arranges in its appropriate position, constitutes them of their specific elements, develops each after a type established from the commencement of time, the idea of the eternal, which it manifests by its creative power in a form. To this force may be applied the language of the Earth-Spirit in Faust.

“In being’s flood, in action’s storm.

I walk and work, above, beneath,

Work and weave, in endless motion!

Birth and death,

An infinite ocean!

A seizing and giving

The fire of the living.

’Tis thus at the roaring loom of time I ply

And weave for God! the garment thou see’st him by.”

But, into what insignificance shrinks this common, this almost universal organic force—this life-force—the plastic force



of nature when compared to that supreme result of the Creator's work—the "thought-power"—the thinking and conscious principle. The whole machinery of life is merely subservient to its manifestation. It is the terminating point of *creation*; for, to what purpose would be creation without the consciousness that gives the perception of existences. Ideas make the creation; without them there is annihilation. With every new idea developed, an existence before unknown is unfolded; then, as it were, it just starts into being. Change the fundamental ideas that now govern man and regulate his social state, and he will become as a new created being—he will rise in the scale of existence—and society be remodelled on principles of a purer and more exalted civilization. Endowed with intellectual power, man triumphs over the universe; he has dominion over nature; mind is elevated to the attributes, and almost associated to the power of deity. Where is the limit to its capabilities? It creates and embodies its creations in language and works that never die. It surveys the past, and writes the history of time and creation for millions of ages. It embraces the present, and seizes on its accumulated stores of knowledge. It penetrates the future, and foresees what is to come. There is nothing so minute as to escape its attention: nothing too vast for its comprehension. Now it detects and analyzes the imperceptible atom, and now it measures and describes a world. It dissects the microscopic animalcule; it demonstrates the confirmation of the Leviathan. It ranges through the realms of space, surveys systems, worlds, and planets—measures their distances, plans their movements, and calculates the periods of their revolutions, with a precision that never fails. The whole universe is embraced in the scope of its researches. It is stayed only in its acquisition of knowledge by the limits that separate the things of time from eternity, the created from the creator. Not less varied are its moral capabilities. It can rise, in the elevation and purity of its virtues, to the exaltation of superior and God-like attributes; it is degraded, in its brute and selfish propensities, to the lowest depths of animal brutality. The passions and the instincts, the motive forces that impel the thought-

machinery into activity, and give direction to its efforts, have no settled limits to the extent of their energies. Their powers, irregular in force or direction, are the causes of the numerous ills that afflict the world;—contests, commotions, the sacrifice of the public to private ends, in the political; crimes and vices, mean rivalries, and personal hostilities, in the social state. The organic and functional agitations they endure, disordering the vital movements, are not less mischievous to the organism itself. They are productive of numerous affections, destroying the moral or intellectual sanity, or deranging the visceral functions. In this sketch is hastily portrayed the contexturing of the human economy of that earth's temple, and of the creating and ruling power—the “God-spirit”—that dwells within it. “*The revelation of Heaven in the flesh.*” The “man mechanics” is an epitome of the mechanics of the universe. It combines earth, and matter, and time, to conscious intelligence, spirit, and eternity. It manifests physical phenomena and dynamic forces. There exist in it, at the same moment in full activity, physical actions, chemical actions, organic or life actions, intellectual or thought actions. It is an automaton in its organic machinery, yet mind-governed, soul-directed in the purposes of its existence.

Being the perfection of the animal type, the human organism necessarily includes within itself, all the structures of the inferior orders. In its development, from the first germ, a formless fluid, it passes through every inferior grade of organization. In the language of Carus, “it repeats in itself the idea of the whole animal creation.” The ancients, accustomed to observe closely, gave to nature at large the term “*macrocosm*,” or whole and visible world. The human economy they appropriately named microcosm, or smaller world. And happy is the appellation; for truly is it a world of wonders, more difficult to study, to know thoroughly, to dive into the depths of its mysteries, than all the other works of nature. For this being, with its organic texturing, its physical attributes, its dynamic energies, and spiritual endowments, is a focus where are concentrated, where mix and conflict together all the forces of nature; man “*stands in the centre of immensities and in the conflux of eternities.*”

In this picture is exhibited the subject matter of the *science of medicine*. A knowledge of the human organization is its ground-work. Without this knowledge the practice of medicine must be a rude and gross pretension. While this knowledge remains imperfect, at the best the practice must continue what it long was, and has so often been reproached with—a conjectural and *uncertain art*. *Ars conjecturalis et incerta*. But who does not perceive the almost insurmountable difficulties with which the pure philosophy of medicine is encompassed? Who does not feel, in the present state of science, how hopeless is the expectation that it can be penetrated and laid bare to its most intricate and hidden recesses. Still, this task the profession is bound to labour at until accomplished. In no other manner, though it is the work of time, of long and profound research, can the *science* be perfected. It is through this knowledge alone that the chosen servitors of the altar can be distinguished from the herds of vulgar pretenders, that crowd the paths leading to the *temple*. In what manner can this subject, so fraught with difficulties, be approached and investigated? It is obvious, that the animal economy, looked on collectively as to structure; its phenomena, its forces, and movements abstractly regarded, the course heretofore almost exclusively adopted, no certain results can be attained. It must be impossible to acquire positive knowledge. The same means are to be adopted and pursued in the study of the human organization, as are followed in all the positive sciences, and for the acquisition of positive knowledge. That is, *first*, the phenomena are to be accurately determined by close observation and experiment; *second*, the phenomena thus determined are to be analyzed and separated into their distinct classes; *third*, each class of phenomena is to be arranged into formula, according to the order in which they occur or are connected together.

Thus, as existing in the human organization, the physical and chemical phenomena, the last comprising the whole of the organic functions, are to be examined under their separate categories. The organic physical and chemical phenomena, as it respects each organic element, tissue, and organ, must be equally



investigated. The dynamics of the organism, or the forces sustaining its actions, are to be studied through the medium of the phenomena they occasion. The intellectual and moral phenomena entering into so numerous a class of affections, it is not less necessary, should be observed and arranged in their appropriate category, through the means of their peculiar phenomena. When these investigations have been completed, in the first place for the natural or healthy condition, in the next for the unnatural or pathological, and, lastly, under the modifications of exterior or therapeutic agents, then will *medicine* have reached that state of improvement which will elevate it to the highest rank among the positive sciences. Difficult as this may seem, its accomplishment is possible, and what is possible time and talent and application will accomplish. Much of this information can now be acquired by those who will devote the labour necessary for that purpose, and the more *profound* and *extensive* and *accurate* the knowledge a physician has acquired of the phenomena of the animal organism, the more extended and active will be his capacity to control and direct the actions of the economy for its safety and well being. In no respect can it be said with as much of truth as in medical science—that knowledge is power. The profoundly instructed physician has given to him power over the most mysterious of the forces of nature. He wields them with a giant's arm, and does with them as he listeth—life and death are at his command. Like an inspired seer he looks, and, as in a plain and lettered book, reads the mysteries of man's interior formation; disease cannot elude his searching eye; he traces and detects it in its most secret lurking places. He has a prophet's character; he announces what has already past; with a sure prescience he foretells the future, and the future verifies his prediction. His opinion is fate; he does, and his doing, certain of its end, executes to the full extent what God has permitted human power to perform; he is arrested at the limit when the divine fiat has pronounced—thus far thou shalt go and no farther.

Human knowledge is restricted to the phenomena of this universe, determinable by the senses. The arrangement or co-



ordination of those phenomena, in their relations to each other, and the order of their succession or production, constitutes science, or positive knowledge. Phenomena are always effects. They proceed from remote unknown causes, placed beyond the pale of human intelligence. In this state of being, it is not given to man to arrive at so exalted a state of intellectual existence. *They are the secrets of eternity, and lie undivulged in the eternal mind.*

It is true, that in every series or formulæ of phenomena, each phenomenon acts as a cause to all that follow it, while itself is an effect of all that have preceded it. This kind of causation our minds can perceive. It can be determined by observation and established by experiment. But the whole series commences from a remote and unknown cause; forever inscrutable by the human intellect. The phenomena of the universe, proceeding from causes whose activity commenced with time and creation, causes that may be almost regarded as the direct emanations of divine power, have a necessary existence. Each one is what it was ordained to be—occupies the position and accomplishes the end it was intended for. Nothing has proceeded, nothing could, nothing can proceed from chance or mere accident. In a philosophical sense, every thing, from the greatest to the least, has been foreordained, and is, from a necessity, that it should be. The phenomena presented by all organized beings, by man himself, belong to the same order, exhibit the same character. It is certain, as has already been remarked, that, in the human organism, there are commingled a greater variety of phenomena, and consequently greater diversity of forces or remote causes productive of phenomena, than in any other object in creation. It presents, in consequence, great difficulties in the discrimination and arrangement of its phenomena in their respective classes. At the same time, it manifests extreme mutability, incessant activity, a vast range of susceptibility, in the production of phenomena. Notwithstanding this apparent fluctuation and unsteadiness of its phenomena, they are not less fixed or have less of purpose than the other phenomena of the universe. The real difficulty consists

in their complexity, in the manner in which the different series are connected with and run into each other; so that extensive and accurate knowledge, a fine practical tact, and discriminating judgment, are indispensable in the observer, to enable him to separate them from each other, and to constitute their separate series or formulæ. From the want of this necessary information and discipline of the mind, things perfectly distinct are often confounded, false observations are frequently made, and many mistakes in physiology, pathology, and therapeutics are daily committed and placed on record. Of the many who undertake to write or to instruct in *medical science*, few possess the prerequisites that would constitute them authority, even as to the facts they profess to observe and to teach.

No one can investigate, even in a cursory manner, the general phenomena of the organism of our species, and not be impressed with the conviction, that every phenomenon is the result of a force or law framed in a fixed design. Does not its development, from the germ to its birth, occur in an absolute order? Are not its form and its organs moulded after the laws of a high, a transcendental geometry, with most perfect regularity? They commence from a definite act. They appear at a determined period, take a specific shape, acquire a certain growth in a given time, have a positive limit assigned to each in space; then it enters into this breathing world at an established epoch. And after it has appeared on this bustling yet transitory scene of life, it runs a new course, having its different stadia, infancy, childhood, youth, manhood, age, and senility, each having its peculiar characters and attributes. The whole demonstrating the government of causes of uniform and unfailing tendency in the production of phenomena or events. Let us examine in the same spirit all the other phenomena of the animal economy, and the same results will be found. The same character of design, of compulsiveness, prevails in the phenomena of the functions; in the relations of those exterior agents whose forces excite the functions into activity; of those that modify the organs and functions, productive of disease or of therapeutic operations. It is this very fixedness of the organic phenomena that enables medi-

cine to lay pretensions to the character of a science, and imparts value to practical observations. A disease once described accurately, is recognised in all succeeding ages by the same symptoms. In the Book of Epidemics, in the works of Hippocrates, cases are described without naming the disease, in which are readily to be recognised the symptoms of our present typhus and typhoid fever, the last a disease attracting the attention of pathologists at the present moment. What more graphic illustration of the same affection can be found, both as to symptoms and treatment, than in *Huxham's* chapter on *Nervous Fever*, or than that by the *Vienna Professor, Stoll*, in his account of *Mucous Fever*. There is difference as to name, but the thing is the same, as observed and described by each. Ages have made no difference in the character and symptoms of the disease. Intermittents, gout, epilepsy, are as perfectly described by Galen, by Celsus, by Aretæus, as by any modern writers. Time and experience, in the description of *diseases*, have added very little indeed to what was accomplished by the early fathers of our science. Who has in fact improved to any extent on the Prognostics of Hippocrates, who has added largely to his observations of symptoms in the *Coactæ*, or to those of Celsus. They may be read as they ought to be, at this day, with profit by every student and practitioner. The same remarks are applicable to medicinal agents. How large a portion of the medicines we employ were discovered, many of them anterior to our era, and employed in the treatment of diseases by the Greek, Roman, and Arabian physicians! The descriptions they have given of their powers, their effects on particular organs, or the whole economy, their applicability to certain diseases, are current even at the present time.

It is no longer a question for discussion, that under the same circumstances, the same pathological causes will produce the same pathological condition; that diseases will present the same symptoms, that the same remedies will occasion the same effects. Why, then, it may be asked, if this statement be correct, do physicians assert that the practice of medicine is the most difficult of arts, and demands requisites of a high order to conduct

it with safety? How is it, that what is called experience, is so often belied by experience? The difficulty lies in this, that in the congregation of diversified phenomena, and congress of various forces mingled and conflicting in mutual reactions in the human organism, it is almost an impossibility, that in all respects the same precise circumstances should be conjoined. The general circumstances may be the same, and hence a certain genus and class of disease, or of remedy, may be established; but, so diversified are the individual differences growing out of differences of constitution, of temperament, of habits of life, of previous diseases, of professions, of food, of clothing, of localities, in fact, of the innumerable causes incessantly at work in modifying the mode of existence of every being, that the varieties of particular cases are interminable. Now, it is the capability to understand, to seize on these individual peculiarities, to trace them to their source, to comprehend the mutations they cause in the phenomena of the disease, in the ordinary operations of remedies, and the method of treatment in general applicable to the affection: it is these qualities that make the physician, that distinguish him from the empiric and routinist, that elevate medicine above the low level of an art, to the loftiness of the noblest science cultivated by human intelligence. It is apparent, that for these purposes, the physician must be master of the principles of his science, drawn from a profound knowledge of the human organization; that he be able to look on the details of the phenomena spread before him from the height of a generality; that he has a mind educated to the perception and discrimination of things, with a practical tact and acumen sharpened by disciplined experience. Now, how are these to be acquired? By sitting on the benches of the lecture rooms, and listening to didactic instruction; by committing to memory the pages of text books; or poring over the volumes of practical authorities, in the retirement of your apartments? No! They are useful; I impeach not the utility, nor question the propriety of this mode of instruction. Books and lectures cannot be dispensed with. But whoever is deceived into the belief, that he can by such means alone acquire practical skill, or discharge with fidelity the re-



sponsible duties he has assumed, will be aroused from his delusion by the conscious shame of his deficiencies, or the louder voice of public reprobation.

These indispensable requirements for an able and safe practitioner, are to be obtained only in the workshop of nature. They flow from clinical instruction, from the direct instruction of the senses in the accurate appreciation of phenomena, at the bed-side of the sick. It is here alone you can learn to observe, to discriminate, and to analyze what you observe, and note the differences characterizing each peculiar case; it is here that you learn, by actual experiment, the value of remedies, and methods of treatment, extolled and inculcated by writers and teachers. It is in the wards of hospitals that is to be learned the art of interrogating nature. In the dead-house and dissecting room, with scalpel in hand on the dead body, is to be tested by the touch-stone of actual observation the diagnosis that had been made during life, and its truth ascertained. It will be verified or refuted, and the value of the symptoms, as signs, demonstrated by an illustration of their causes in the state of the organs. In this manner can alone be settled on a firm basis the true nature of disease. We read it there in characters stamped by nature herself on the organs, in the alterations of their structure. From the facts thus observed, we may then ascend by a filiation and progression of phenomena to the original deviations of the vital re-actions and movement, the first cause and essential nature of disease.

Let us turn our attention for a moment to *medicine*, not as it should be and finally may be, but contemplate it in its actual state; what it is capable of becoming; the best direction to be given to it; and what should constitute the objects and character of a physician.

*Medicine* is an *art* and a *science*. It is an art, as from the necessary connexion and succession of the phenomena that occur in the actions of the animal economy, axioms can be established and practical rules can be laid down, applicable to a great extent in the treatment of disease, especially those of ordinary occurrence. In this character it is *empirical*. Let us be under-

stood. There are different kinds of empiricism. Empiricism may be gross and vulgar, as it is presented in the rapacious and ignorant quack, who, with his nostrum, pretends to possess a cure for every malady ; or, it is enlightened and intelligent, drawing its resources from the recorded observations of instructed and experienced physicians, whose lives have been devoted to the healing art. For the most part, with the knowledge we possess, medicine cannot rise to higher pretensions in its practice. Happily, in a vast proportion of diseases, the accumulated experience of the profession has discovered the characteristic signs by which most diseases may be known ; the methods of treatment applicable to them ; the kind of remedial actions that either favour the natural recuperative movements of the economy, or do not absolutely destroy them.

Diseases, as respects their natural termination, may be thrown into three classes. 1st. Those in which the powers of the constitution are perfectly capable, aided or not by treatment, for the removal of the disease, and the recovery of the patient. Many cases of this class recover, though the patient by his folly, the physician by his ill-timed interference and remedies misapplied, are calculated to oppose it. Cases of this class furnish to ignorant pretenders the mass of their boasted cures.

2d. Those in which the unassisted powers of the constitution are, of themselves, inadequate to protect the organism from the ravages of disease. A judicious treatment and appropriate remedies, aiding and directing the efforts of the economy, regulated by the nature of the symptoms, and guided by reason and experience, are here interposed with the happiest results. It is in this class that learning, talent, skill, display their triumphs ; that the *medical practitioner* stands unrivalled—the solace of the suffering—the hope of the despairing. It is for its important services in this class of diseases, that the *medical profession* must ever hold its elevated position in society, and be incorporated with its highest interests. In the calm or the steady breeze, the barque may be intrusted to a common steersman's hand ; but in the fury of the storm, in difficult straits, and on unknown shores, it is the disciplined pilot, skilled in all the re-

sources of his art, that can alone carry it safely through the conflict of elements in which it is involved, and the doubtful passes it encounters.

3d. Those, that from the exhaustion of the constitution, its original feebleness, or the intensity and violence, or the peculiar character of the disease, a fatal result must ensue. Medicine may oppose a resistance; it may delay, it may palliate, it may alleviate, but for a cure it has no power. *The victim must fulfil his destiny.*

Medicine, cultivated as an art, can never reach beyond a certain degree of perfection. From the complication and mutability of the organic phenomena, numerous exceptions are constantly arising, to which experience and established rules of practice cannot apply. They stand isolated. Nosology has no niche in which they can be placed. Experience has stored up no remedy that has been prescribed. To every physician of extended practice, such cases are of almost daily occurrence. In these circumstances it is that science is indispensable; that principles in medicine can alone be relied on. Like the compass directing the mariner over the trackless deep, they will guide him to his object with certainty and success.

That medicine is a science, as well as art, admits no doubt. That it is capable of principles to be relied on, and of explaining the production of phenomena, who will question? But where are we to look for those principles; what is the character of this science? It is in the study of organization, human and comparative, the analytical study and examination of all organic phenomena, with their arrangement according to the especial class to which they belong, from which will spring forth the philosophy of medicine in the vigour and beauty and excellence of truth.

Medicine, as a science, must be founded on the *laws of organic formation*. They are the governing principle of the organic movements in which consists life. The investigation of these laws is the direction into which are to be turned the scientific researches of medical philosophy; every act of life is dynamic—productive of power—or it is formative. Life itself is at once

a cause and an effect of organization. Movement—force and form-producing—is the activity of life. The cessation of movement is death. Every phenomenon of the animal economy emanates more or less directly from a fundamental or primitive law—the force or law of organization. That such a law exists, is demonstrated in the geometrical regularity of the forms of every organized being, of every organ developed after an invariable type, of every tissue having its peculiar properties. It is seen in the immutable composition of every being, of every organ, of every tissue. It is proclaimed in the fixed succession of the organic, physiological, pathological, and therapeutic phenomena. The laws of organic formation have then a necessary and regular action, and preside over all the phenomena of life. They are to be investigated by the cultivation of transcendental and genetic anatomy, or the history of the laws and order of development of the various organs of the animal economy.

The fulfilment of the operation of these laws in the natural structure, is demonstrated in comparative and general anatomy; and their perversion or irregular action is manifested in the morbid products of nutrition or secretion, illustrated by pathological anatomy, the effects of disease on the organs or the products of organs.

All the phenomena of organization, physiological or pathological, are thus referable, like all other phenomena of nature, to a small category of general laws. Physical phenomena, according to the class they belong to, are referred to a few simple laws, as of gravity, of caloric, of affinity, of galvanism, of electricity, of magnetism, all of which, it can now be scarcely doubted, are themselves but modifications of one great law or force. The force producing physiological or organic phenomena, may be no more than a modification of the same ruling power displaying its activity in organized matter. Strong analogies could be advanced to sustain this view.

Organic phenomena, notwithstanding their great diversity, the innumerable aspects and shades they present, the immense variety of forms they assume, similar to other phenomena of nature, are susceptible of a philosophical arrangement, on a simple yet



scientific basis, and that basis is the law of *organic formation*. The laws of organization are uniform and universal. Man, who is the concentrated idea of nature, a microcosm, is the subject of their operation, as well as the least of organized beings. Those laws, observed and detected with greater facility in the inferior beings of the organic creation, are the laws of the human economy; for a law once ascertained is universal. The knowledge of those laws is acquired in a two-fold manner; 1st, by research into the facts of organization in every variety of organic formation, vegetable and animal; 2d, by a knowledge derived from general philosophy. Sustained and enlightened by those aids, we are enabled to evolve by logical induction the interior laws that preside over the phenomena or functions of vitality. These functions are manifested to us by movements and by products. Though closely connected, yet the study of movements and products constitutes two distinct branches of knowledge. Movements, the influence or powers that cause them, the directions they assume from the combined influence of powers and resistances, intrinsic or external, when studied in inorganic bodies, constitute physics; and in organized bodies, physiology, or as it may be more aptly named, *organic physics*.

A knowledge of products, as they occur in organized beings, is the pursuit of organic chemistry, which alone can enlighten us on this important department of medical science. As yet, so slow has been its progress, that organic chemistry affords little aid to physiological or pathological investigations. The science of medicine, in this aspect, presents a vast hiatus. From the light that now begins to break in, in this direction, we may predict that some of the darkest spots of our science will be illuminated with meridian splendour, and phenomena, now incapable of a just appreciation, be clearly understood, when organic chemistry shall have attained the perfection of which it is susceptible. Until organic physics and organic chemistry are advanced to a higher degree of cultivation, the philosophy of medicine, the re-union of common principles derived from numerous collateral branches, must remain imperfectly developed. We must not on this account turn our attention from it as a vain pursuit.

The eye of the physician must be steadily directed to this the cynosure of his art, though its light be dimmed by mists or often obscured by clouds. All of our knowledge is more or less imperfect. In our present state it is our duty not to reject what is defective, but to understand the extent to which it can be made useful; for though we must abandon the expectation of witnessing the science and philosophy of medicine, arrayed in the glory of demonstrated truth, yet the path may be discerned that leads in the direction to this great result. The law of organic formation, we have already stated, is believed to embrace the fundamental principle of medical philosophy. It presents the key of numerous important physiological, pathological, and therapeutic phenomena. This fundamental law admits of several sub-divisions. Two of the principal that bear more immediately on our subject we have barely time to allude to. They are, 1st, the law of organic development, filiation of organs, and progression of forces and actions. 2d. The law of nutrition, or the reproduction of individual organs and beings, the material products of the organic forces and actions, accomplishing nutrition.

The first law is demonstrated in transcendental, comparative, and genetic anatomy. In the vegetable and animal creations are presented innumerable forms of organs and beings, invariably reproduced under the same circumstances. A fixed type governs their formation. They are the material creation by the forces of nature—the instruments of creative wisdom acting on the elements of matter—of the idea of organic forms conceived in the eternal mind.

Vegetable and animal beings exhibit an ascending scale, proceeding from the simplest to the most complicated organization. There is a gradual development or filiation of organ super-added to organ, in a connected series. With each new organ power is developed with the organ, and new phenomena or actions are displayed. In the animal scale, the lower grades exhibit centres of power, with corresponding sections of organs possessing independent action observable by examination. The animals of higher grade repeat and include the lower organizations; but the centres and sections coalesce in them, and are no longer

capable of demonstration by the anatomist; they nevertheless exist, and their influence is easily recognised in numerous phenomena, especially in the pathological demonstrations of disease.

Individual development, either of organs or the complete being, follows a fixed law of analogous character. Every organ and being is formed from the exterior surfaces in succession or filiation towards the centre. The most perfected organization, in its first origin, resembles the lowest. It passes through the phases of organization, and its different periods represent the various degrees of the scale of animality. Centralization and the coalescence of distinct sections are the tendency of organization, and is early completed in the embryo of the perfect animal. But, in the perfect, successive formation and development prevail as in the lowest. The nervous expansion or element of the tissues is formed before the nervous cord, the cord before the spinal centres, and the spinal centres before the brain. The blood and intertextular circulation exist before the vessels, the heart, and the general circulation; the viscera and secerning organs of the secretions are the last to be completed.

The movements of life follow in their progression this movement of development. All impressions that influence the nervous centres are received on or commence in the surfaces. They are transmitted or pass along the nervous cords; they reach the nervous centres, the impressions they excite there are reflected or re-transmitted into the interior of the organism; are received or expended on the viscera or other organs, and are productive of various phenomena, according to the function of the organ, the nature and intensity of the impression.

In organic life the same order is observed. The elements for the reparation of the organs and the secretions enter at the surfaces, alimentary and pulmonary, sometimes cutaneous; are transmitted more or less directly into the current of the circulation, and thence they penetrate into the interior of the organs they are to supply and to renovate, and finally are eliminated by the excretions and emunctories.

The actions of therapeutic agents follow the same course; they excite the nervous tissue of some surface; the impression is

transmitted to the nervous centres; then reflected actions are awakened in the organs and expended in their functional excitement. Or, their particles absorbed from the surfaces enter the current of the circulation, excite in the organs, with which they possess a specific relation, their peculiar modifications, and then are rejected through some emunctory from the economy.

The law of organic development, of the filiation of organs, of the progressive movements of the organic forces and actions, is thus seen to preside over and direct the general or constitutional actions and phenomena of the animal economy. The law of nutrition or organization is illustrated by general and molecular anatomy. It determines in each organ the specific actions or movements, by which each separate tissue and organ is constituted, out of the plastic elements existing in the nutritive fluid, the *blood*. It is specific for each tissue and organ. It combines the organic elements, and forms of them, in one place, *bone*, in another, *tendon*, or *cartilage*, or *muscle*, or *nerve*, or *spinal cord* or *brain*, or *vessel*, or *membrane*, or *parenchyma*; and in this manner weaves the compounded intertexture of the animal organization. The influence of this law is local; it is the immediate cause determining all the modifications of structure, the alterations of secretions, the transformation of tissues, the various physical or material conditions, natural or otherwise, in which the animal organization exists.

Pathological phenomena are not accidents, arbitrary, unsettled, indefinite in character and occurrence. They possess a positive character, have invariable forms. They are susceptible of a natural arrangement in orders, classes, and genera. Wherever there is order, a regular succession of phenomena or events, there must be a predominant and ruling law, or general principle. In investigating the production of pathological phenomena, we are then to look for this law. But where can it be found except in the law of organic formation—a fundamental law of all vital phenomena. This law is susceptible of deviation from its natural order. The production of monstrosities, the transformation of tissues, the alterations of organs, and the formation of anomalous products, establish the fact.



In acute diseases pathologists have recognised two orders of phenomena or symptoms—the one general, the other local. They often exist concurrently; they are frequently connected; they are seen at times separated. There is not, then, an absolute, a necessary connexion between them. This question of connexion between the general and local symptoms has divided pathologists. A too limited and exclusive view of the facts has been the origin of the discussion.

The general phenomena or symptoms termed fever, present a regular succession or series of events or phenomena. Examined accurately, they appear to follow in their progression precisely the law of development—the succession of organs and progressive movements of vitality.

The morbid impressions or morbid phenomena are first manifested in the surfaces—horripilation, cutis anserina, pallidness, drying up of issues and ulcers for the cutaneous surface—loss of appetite, nausea, pasty mouth, constipation, or diarrhœa, for the alimentary. They next are displayed in the spine, at the lumbar region generally, the first nervous centre that appears in the embryo. Hence the pain in the back, the neuralgic pains of the extremities, the muscular disorder, vertigo, confusion of senses, and headache. The next link in the chain exhibits the transmission into the vascular apparatus, excitement of the heart, re-action, increased heat, rapid and forcible circulation. The last series in the chain is fulness or turgescence of the secretory apparatus, ending in an evaculatory elimination from some emunctory, as by sweat, by urine, by expectoration, by vomiting, by stool, or by the eruption of exantheams.

The series of events that constitute fever, occupy in production and duration periods varying from a few hours or some days to several weeks.

When the series is completed within twenty-four hours, it is called a paroxysm. When it is continued some days or weeks, it is regarded as continued fever. If the paroxysm does not recur, the fever is called an ephemera; but, if repeated at intervals, it constitutes a paroxysmal or intermittent fever.

The nervous centres, from the intensity, specific nature of the

morbific cause, or other circumstances, appear in some forms of disease too enfeebled to produce decided vascular re-action, or to excite the discerning apparatus. They cannot relieve themselves by a complete transmission from the morbid oppression under which they labour. There is then fever with want of power—*adynamia*—fevers of the typhoid type.

Again, some of the nervous centres are completely paralyzed, and the functions of the organs they preside over and regulate are either suppressed or exist in the greatest disorder. The regular progression of the febrile series, and the natural termination of the febrile movement, are impossible. This is *ataxia*, or malignant form of disease, *typhus gravior*—and what is inappropriately termed congestive fever.

The general pathological phenomena, or fever, are seen to consist in a progression of actions proceeding in the path of the normal movements of the organism, under the guidance of the law of development; and it is no forced analogy, but a following out of a direct succession of facts or events that leads to the induction, that the same law, modified by morbid causes, presides over the general pathological as well as the natural phenomena.

When it happens, as it does in many instances, that the morbid impression transmitted to the nervous centres is retained by them; that they are not thrown off into the vascular and secretory organs, febrile symptoms are never induced, disorders of various nervous functions ensue, and we have the class of affections designated by nosologists as the *neuroses*. The excitement of fever or the provoking of the secretions are the best methods for the cure of the *neuroses*. The fact was familiar to the highest authority for correct observation—Hippocrates—who has embodied it in an aphorism—*febris solvit spasma*.

The second order of pathological phenomena are local. They are manifested by local signs. They are congestion, eruptions, inflammation, ulceration, suppuration, thickening, thinning, hardening, softening, transformations and degenerations of structure, or varied modifications of secreted fluids. Local diseases may be confined to a single organ, to a part of an organ, or even to a

single tissue or element of an organ. Local diseases or pathological phenomena involve alterations of structure, of organization or secretion. They must then necessarily come under the law of nutrition or individual reproduction, and consist in aberrations either of a common or specific nature, of the organic, nutritive, or formative actions.

Local disease is often incapable of awakening general disease. The febrile apparatus remains undisturbed. No fever then accompanies the local affection. Local diseases of sufficient intensity may, however, call this apparatus into operation, and then fever will attend on the local disease. Or, the cause exciting the local disease may, at the same time, produce the general pathological phenomena, which are then concurrent with the local disorder, without a necessary connexion between them. The febrile phenomena may then subside, yet the local phenomena persist in their original or even greater intensity. The acute exanthemata or eruptive fevers, produced by specific contagions, furnish examples. The fever of small pox subsides, while the eruption of pustules continues, and the pustules themselves advance to maturation. Or, the local disease may result, as a consequence, on the general pathological phenomena or fever, from the force or intensity of the transmitted re-action, or its failure to awaken some especial secretion.

Various modifying circumstances, which cannot now be discussed, combine to impart peculiar features to particular forms of disease, and impress them with an especial character, or complicate them with accidental phenomena. These circumstances may be entirely independent of the general or local pathological phenomena. They, nevertheless, influence and modify them in an important manner. Such are the conditions of the blood, an essential element in all vital actions; the specific nature of the morbid influences, exerting specific powers over the vital reactions of the whole economy or of particular organs, as contagions and other animal, malarial, or other poisons. Such also are the peculiar temperament, the constitution, the habits of life, and profession often of the individual.

The preceding sketch is not intended as a theory of medicine.



It is an attempt merely to show the direction in which may be sought the principles of medical science: where are to be found the elements of a natural method of arranging the phenomena of disease, the facts of a sound and lasting theory of fever.

Simple facts can never constitute science. To possess science we must establish laws. We must trace out the genealogy of facts till we arrive at their origin. This can be effected only by following the filiation and progression of phenomena as high as they can mount. We may then establish their formula, or determine the law from which they proceed.

In the attempt that has been made no hypothesis has been invoked. I have connected facts and ascertained their analogies, without a forced induction, as established by the highest authorities, in genetic and comparative anatomy, in physiology and in pathology. These facts have no discrepancies; they harmonize with each other; they tend to one point, and merge in one general phenomenon or law—the law of organic formation—embracing the law of development or filiation of organs and progression of action; and the law of nutrition or organization.

In Therapeutics the same law is applicable. The general pathological phenomena being distinct from the local, each requires a separate attention, and a distinct remedial treatment.

The general phenomena, or fever, in the view that has been presented, is shown to be a functional process of the economy. It is accomplished by an extensive apparatus of different organs. It is salutary and recuperative in its design. When, then, it is pursuing its natural course, it must terminate favourably. The physician has no business to interfere with it. He cannot mend that which is for the best. He may by injudicious and intemperate measures perpetrate mischief. His duty is to watch the events, and to interpose for the purpose of regulating when the necessity for it appears. When the process of fever becomes irregular; when nature, unassisted, cannot carry on the operations that are necessary to complete the work she has on hand, then it is that he is called upon to exert the energies of his art, and to invoke all the resources of his skill, in this dangerous emergency. He will aid nature in her efforts, sustain where she



is feeble, repress the movements and actions that are excessive or irregular, and impress on them a more salutary direction. The more thoroughly he is imbued with a knowledge of the phenomena and laws of the organism, the more clearly will he understand what he ought to accomplish, why it is to be accomplished, when and by what means it is to be accomplished; the more certainly will success attend on his exertions for the restoration of his patient.

The treatment for local disease is to be sought for in special therapeutics and the rich stores of the *Materia Medica*. Experience and observation have demonstrated that the natural agents known as remedial and medicinal, are capable, with judicious management, of influencing the actions of the whole economy; or are endowed with specific powers having relation to some organ or function which they influence or modify in a specific mode. The physician familiar with the exhaustless resources of special therapeutics and the *Materia Medica*, and instructed in the specific relations of medicinal powers and organic or functional activity, finds in them the means of countervailing the local phenomena of disease, which consist in aberrations or vices of the law of nutrition.

General and special therapeutics—the treatment for the general and local affection may be pursued simultaneously, or the one may precede the other: they may be similar in character, act on the same line, or they may be different in character, opposite in direction and tendency. The nature of the particular case and attending circumstances, must regulate the employment and selection of these means. The discrimination of these diversities, and the adoption and combination of the appropriate measures, are dependent on the knowledge, tact, and judgment of the practitioner.

From the foregoing investigation, we have presented to our view the physician in his true character. He is the minister and interpreter of nature. *Medicus naturæ minister et interpres*. This sentence commences one of the ablest of the practical works derived from and adorning our early science. Time has verified its correctness. It is the conclusion we arrive at, in this inves-

tigation. Let not your ambition inspire you with a higher aim, which you can never reach. Attempt more—vainly strive to rise superior to the limit of human power, by disregarding the laws of nature, and contemning them as beneath your skill—defeat, mortification, reproach, and disgrace will overtake you. The life confided to your charge will be endangered by your ignorance and presumption. But let nature be your guide and instructor—attentively observe and reflect on her phenomena—follow in her footsteps—acquire wisdom from her precepts—knowledge from her lessons—and the great success that will crown your labours, will raise you to honour, wealth, and fame. A world, grateful for your services, will hail you with the name of the helper—the restorer. It will proclaim you a shining light in your own generation—a benefactor to successive generations of mankind.